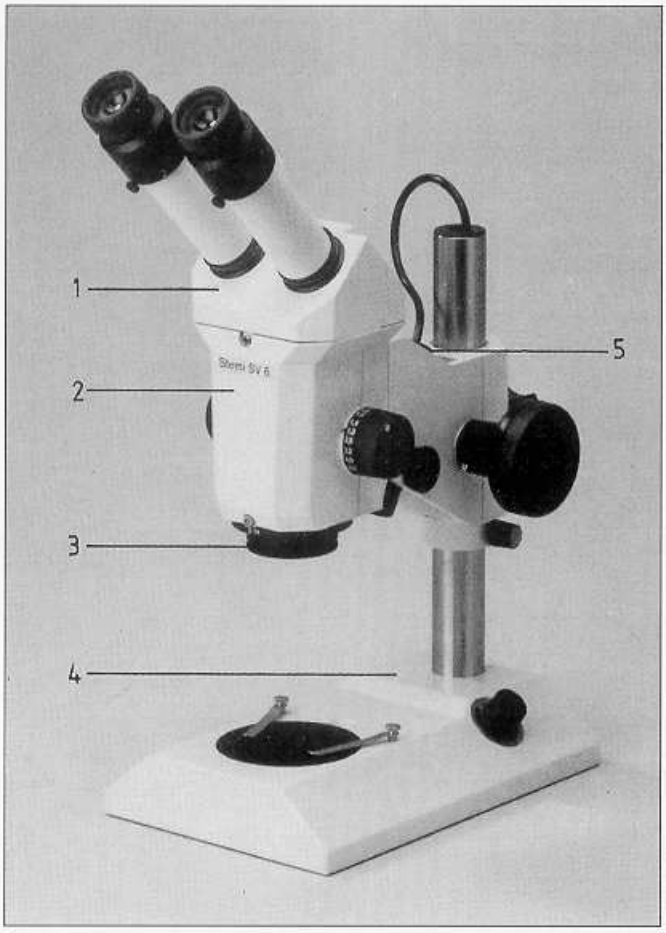
ZEISS

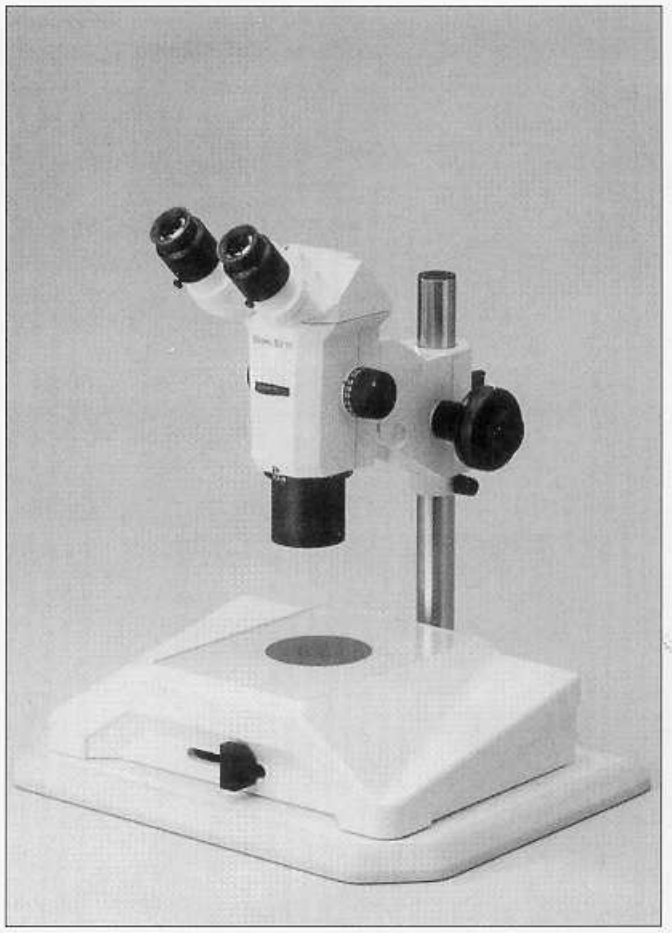
SV 6 and SV 11
Stereomicroscopes

Operating instructions



SV6 Stereomicroscope

1 Binocular tube
2 Stereo body
3 Objective
4 Stand
5 Illuminator



SV 11 Stereomicroscope

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Note :
* The 6 to 10-digit numbers are ordering numbers of instruments or parts, e.g. 457465.
* Alterations and repairs to these instruments may only be carried out by the manufacturer or by persons expressly authorized to do so.
* Subject to technical change.

The modular principle has been used in the product line for the SV 6 and SV 11 Stereomicroscopes, permitting instrument configurations to be optimally adapted to the type and size of the specimen and the documentation requirements.

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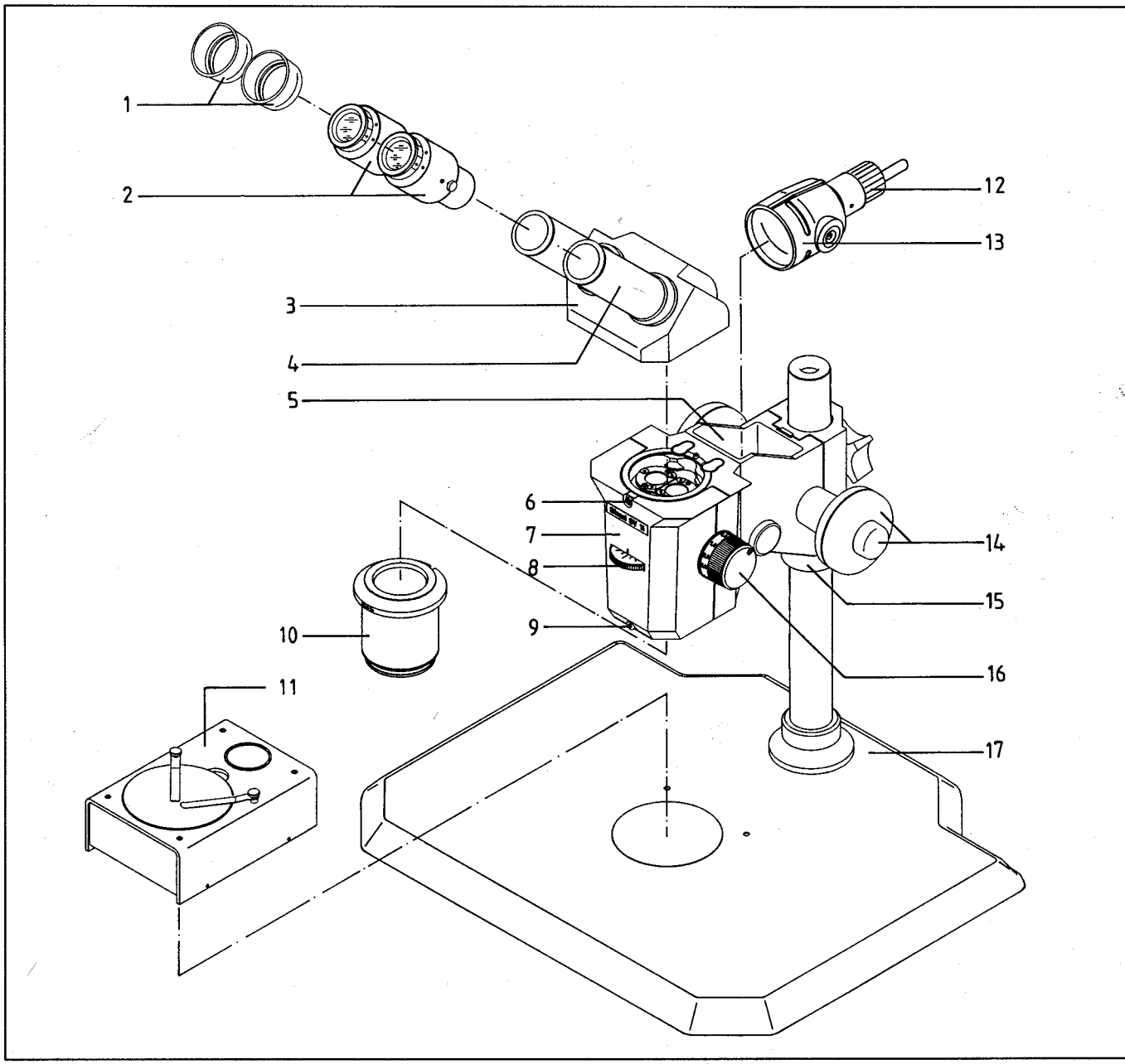

Preparations / Focusing the micrroscopic image

Please note:
Almost all screws important for operation (for mounting the tubes and objectives, for adjusting the ease of motion of the focusing control and the click-stop positions on the zoom system) are hexagonal socket head screws. The right tool for these screws is the screwdriver SW 3 with a red grip (included in delivery package).

Fig 1: SV 11 Stereomicroscope

1 Eyecups
2 Eyepieces
3 Binocular tube
4 Eyepiece barrels
5 Stereomicroscope (stemi) carrier for column 32 with coarse and fine focusing
and receptacle for illuminator
6 Locking screw for tube
7 SV 11 stereo body
8 Double iris diaphragm
9 Locking screw for interchangeable objective S
10 Planachromat S 1.0x objective
11 Transmitted-light attachment
12 Lamp mount with 6 V 10 W halogen bulb
13 Illuminator 10
14 Focusing control knob (coarse / fine)
15 Securing ring
16 Zoom control knob (continuous setting or with click stops)
17 Stand N with large base plate

Preparations

- Mount stereo body on stand column.
- Mount objective S (10) featuring a dovetail ring and a recess on the underside of the stereo body (7) in such a way that the recess of the ring and the pin of the body engage.
Lock objective using screw (9) (SW 3 screwdriver).
- Place binocular tube (3) on the stereo body in such a way that its dovetail ring lies in the tube port of the stereo body and the pin of the port engages with the recess in the tube.
Tighten locking screw (6).
- Insert focusing eyepieces in the tube.
- Place specimen on stage plate.
- Lower stereo body to the approximate working distance.
The stemi carrier should be in the middle of the focusing range. The distance between the mount of the objective and the specimen is approx. 90 mm for the Achromat S 1.0x objective.
- Push securing ring (15) upwards against the microscope carrier (5) and secure.
- Attach illuminator 10 (13) and insert a 6V 10W halogen bulb (see page 11).
- Check instrument voltage. If the voltage indicated on the transformer is the same as the line voltage available, connect power cable to line. Switch on instrument using knob on transformer and adjust brightness.

Focusing the microscope image

- When looking through the focusing eyepieces (2) in the binocular tube, you will see a bright circle (field stop) with each eye. To obtain one image, set eyepiece barrels (4) to your interpupillary distance.
- Eyepiece adjustment:
- Set both eyepieces foc. to "0".
- Use control (16) to select the highest zoom factor.
- Use control (14) to focus image.
- Then select the lowest zoom factor and correct sharpness by setting both eyepieces to your refractive powers. Turn the eyepiece setting rings at first all the way anticlockwise " + ", and then, while observing the image, slowly in the " - " direction until the image is in focus. Write down your dioptric values. This ensures that the image sharpness of identical object features is maintained throughout the entire zoom range.
- Tilt illuminator 10 (13) and turn lamp mount (12) until optimum illumination of the specimen is obtained.
- Image sharpness and depth of field can be improved by narrowing the double iris diaphragm (8).

- For **transmitted-light** use: insert transmitted-light attachment (11) in such a way that its pins engage with the holes intended for the stage clips of the base. (Set lamp mount (12) at right angles to the entrance aperture of the attachment).

SV 6 and SV 11 stereo bodies

General

The SV 6 and SV 11 stereo bodies are telescopic systems. They have a main objective and are ideally suited for flat specimens. The two separate beam paths run parallel to each other and are combined by the objective in the specimen plane.
It is therefore easy to attach accessories, such as a drawing tube, an intermediate tube or a coaxial reflected-light unit.
Both stereo bodies feature port (1) with locking screw (2) for attaching a binocular tube. A dovetail ring with a positioning pin is located on the undersides of the two bodies for mounting an objective S. Screw (4) is used to lock the objective.

SV 6 stereo body

includes a 6.25:1 ratio zoom system.
Knob (3) for stepless magnification setting between 0.8x ... 5x has click-stops at
0.8x - 1x - 1.2x - 1.6x - 2x - 2.5x - 3.2x - 4x - 5x.
If an objective S 1.0x and eyepieces 10x are used, a total magnification of 8x...50x is obtained (also see total magnifications, page 9).

Using an SW 3 screwdriver, screw (6) can be turned through 90°; this activates or deactivates the click-stop mechanism.

SV 11 stereo body

includes a 11:1 ratio zoom system.
Knob (5) for stepless magnification setting between 0.6x ... 6.6x has defeatable click-stops at
0.6x - 0.8x - 1x - 1.2x - 2x - 2.5x - 3.2x - 5x - 6.6x.
If an objective S 1.0x and eyepieces 10x are used, a total magnification of 6x...66x is obtained (also see total magnifications, page 9).

To override the click stops, you can rotate screw (6) through 90° using an SW 3 screwdriver.

Double iris diaphragm (7) is used to enhance the image contrast and the depth of field. This, however, reduces resolution.

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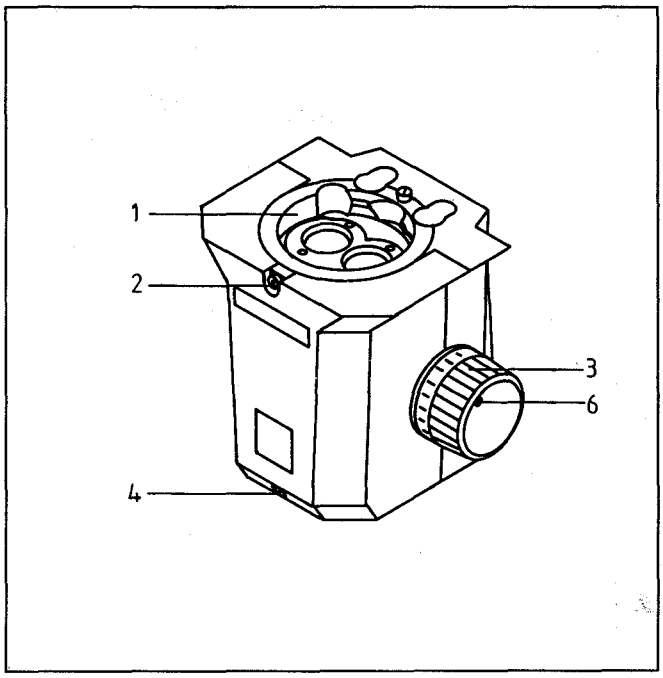

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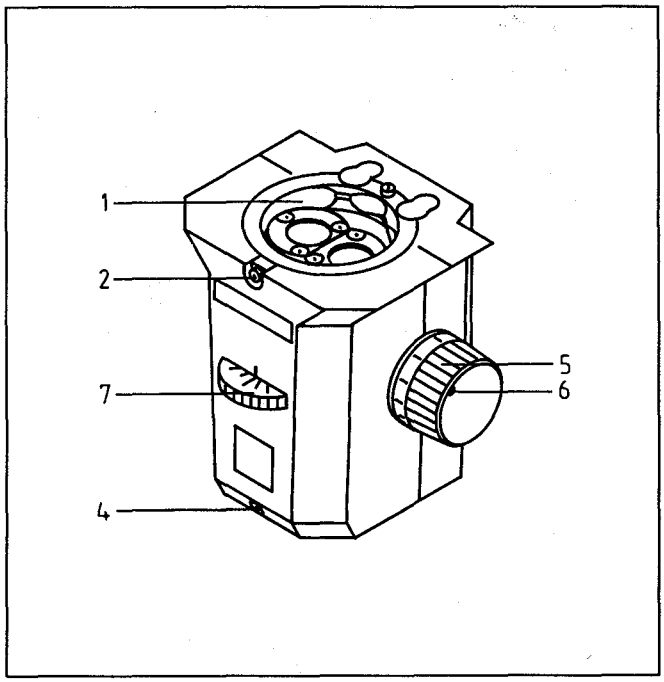

Objectives

A wide range of objectives is available. Their dovetail ring mounts makes them easy to change. The objectives differ in their focal lengths and magnifications, i.e. their free working distances and resolving powers. As the table shows, one parameter runs contrary to the other.

Objective/ Magnification	f mm	WD mm	R µm	Cat.No.
Achromat S 0.63x	160	147	6.1	45 50 63
Achromat S 1.0x	100	90	3.9	45 50 60
Achromat S 1.6x	63	48	2.5	45 50 61
Achromat S 2.5x	40	27	1.5	45 50 69
Planachromat S 1.0x	100	87	3.9	45 50 70
Duo DS 1.0x	100	86	3.9	45 50 68

f = focal length of objective WD = working distance
R = minimum distance between periodic lines which can still just be resolved. (Data valid for SV 11, maximum zoom and fully open aperture diaphragm, data for SV 6 lower.)

All objectives S and DS, except S 2.5x, feature an internal thread E 49x0.75 on the front of the mount. Here, filters available from camera dealers or the slit-ring illuminator (see page 13) can be attached using the relevant holding ring (45 51 84). These objectives have 53mm outside diameters.

Objectives with long working distances
To attach these objectives to the stereo body, the adapter Med (45 51 61) is required.
The adapter ring consists of 2 parts. For mounting unscrew the front part, screw in Med objective and screw on front part again.

	M	WD mm	Cat.No.
Objective f=200 mm	0.5x	200	30 51 32
Objective f=250mm	0.4x	250	30 57 05
Objective f=300mm	0.33x	300	30 51 37
Objective f=350mm	0.28x	350	30 57 07
Objective f=400mm	0.25x	400	30 51 46

f = focal length M = magnification WD = working distance

Further objectives up to f = 2,000 mm are available.

The different objectives are used in the following specific fields:

Achromat S 0.63x (45 50 63)
Objective with extremely good field flattening.
They image large object fields with edge-to-edge sharpness and pronounced depth of field.
The long working distance of 147 mm makes the object easy to handle.

Achromat S 1.0x (45 50 60)
Standard objective for all types of routine work.
Its working distance of 90 mm offers enough room for manipulation of the object.

Achromat S 1.6x (45 50 61)
Objective with a high magnification and a high resolving power.

Achromat S 2.5x (45 50 69)
Objective with a highest magnification and a highest resolving power. The field of view will be vignetted with zoom settings below 0.8x.

Planachromat S 1.0x (45 50 70)
This flat-field objective is ideally suited for the examination and photography of specimens with a flat surface, such as wafers, metal sections and large specimens. The holding ring for accessories may be unscrewed.

Duo DS 1.0x (45 50 68)
This objective is particularly well suited for low-contrast, three-dimensional specimens which are to be imaged in their natural coloring. This objective combines the properties of the Greenough system with those of the telescopic system.

Intermediate plate (45 51 60)
for axial imaging, monocular viewing and optimum image quality.
The intermediate plate is placed between the objective and the stereo body. As the effect of the plate is that the object will no longer be in the field-of-view center, the stereomicroscope must be repositioned by turning it on column 32. This plate is mainly used in photomicrography, TV microscopy, length measurements and polarisation.

To obtain a higher total magnification, it is advisable to increase the magnification of the objective instead that of the eyepiece.

Eyepieces

4

Magnification/ Field of view number	AF	D mm	Cat.No.
W-PL 10x/23 Br.foc. with spectacle protection ring	50°	26	45 50 44
W 10x/21 foc. with eyecup	46°	26	45 50 42
W-PL 16x/16 Br.foc. with spectacle protection ring	54°	21	45 50 48
W 25x/10 foc. with eyecup	53°	21	45 50 46

AF = Angular field
D = diameter of insertable reticle

All eyepieces foc. feature dioptric adjustment devices (see page 5).

Eyecups (44 48 01) are available for the W-PL 10x/23 and W-PL 16x/16 eyepieces.

Designations
The eyepieces are marked with their magnifications and field of view numbers.
Other:
W: wide-angle eyepiece
PL: wide-angle eyepiece with particularly good field flattening and low distortion
Br: eyepieces for spectacle wearers, i.e. the distance between the eye and the last eyepiece lens is large.
foc: focusing eyepiece with reticle mount.

Inserting and setting the eyepieces
- All eyepieces listed are fastened in the binocular tubes using the eyepiece locking screw.
- Loosen locking screw far enough to allow insertion of the eyepieces.
- Setting the eyepieces:

- Set both eyepieces to "0".
- Select the highest zoom factor.
- Focus the image using the focusing control.
- Then select the lowest zoom factor and correct sharpness by setting both eyepieces to your refractive powers. Turn the eyepiece setting rings at first all the way anticlockwise " + ", and then, while observing the image, slowly in " - " direction until the image is in focus. Write down your dioptric values. This ensures that the image sharpness of identical object features is maintained throughout the entire zoom range.

Reticles
Focusing eyepieces are suitable for the integration of reticles; the image shift caused by the reticles can be compensated by setting the eyepiece to the red dot (zero) instead of the white dot.

The reticles should be changed by an expert, as cleanness and accuracy of alignment are extremely critical. (For this, the lower eyepiece section of eyepieces 16x and 25x must be unscrewed. In the eyepieces 10x/21 and 10x/23, three threaded bolts must be loosened. The reticle side with the scale must face downwards.)

Reticles with **26 mm dia.** :

- Micrometer disk 10:100 — 47 40 66-9901
  10 mm in 100 subdivisions
- Crossline micrometer disk 14:140 — 47 40 60
  14 mm in 140 subdivisions
- Crossline disk — 47 40 64
- Net micrometer disk 12.5x12.5/5 — 47 40 68
  12.5x12.5 mm, divided into 5x5 squares, with additional marking of edge centers

21 mm dia. reticles:

- Micrometer disk 10:100 — 43 40 11
  10 mm in 100 subdivisions
- Crossline micrometer disk 10:100 — 43 40 13
  10 mm in 100 subdivisions
- Net micrometer 10x10/5:10 — 45 40 20
  10x10mm subdivided in 5x5 and 10x10 squares

The reticles are calibrated using a stage micrometer 25+50/10 mm (47 40 25) ; see also brochure G 41-100).

Reticles with format outline for photomicrography are described in the manuals on the microscope cameras.

Binocular and intermediate tubes

The following tubes are available for the stereomicroscopes:

Binocular tube S 45° (45 50 75) (1)

The binocular tube provides a viewing angle of 45°.

Binocular tube S 35°with a lowm viewing height (45 50 79)

The binocular tube S 35° provides a lower viewing height and therefore it's often more ergononic than the binocular tube S 45°.

Tiltable binocular tube 0.86x, 0° - 180° (45 50 77) (3)
with integral 12.5x eyepieces. With tube factor 0.86x the eyepiece magnification is approx. 11x and the field of view number approx. 21mm.
The user can set the viewing height and viewing angle as required. Tilting the tube provides for a second range of viewing height. The interpupillary distance is set by turning screws (4).

Intermediate tube S 15° (45 50 85) (5)
reduces the viewing angle of the binocular tube 45° from 45° to 30° and brings the viewing tube nearer to the observer. It is used to advantage in combination with a drawing tube, for example.

Attaching the tubes:
- Insert tube in the tube port in such a way that the tube recess engages with the positioning pin of the tube port.
- Tighten locking screw (Fig. 1, 6). Check whether the tube is firmly seated; tighten further, if necessary.

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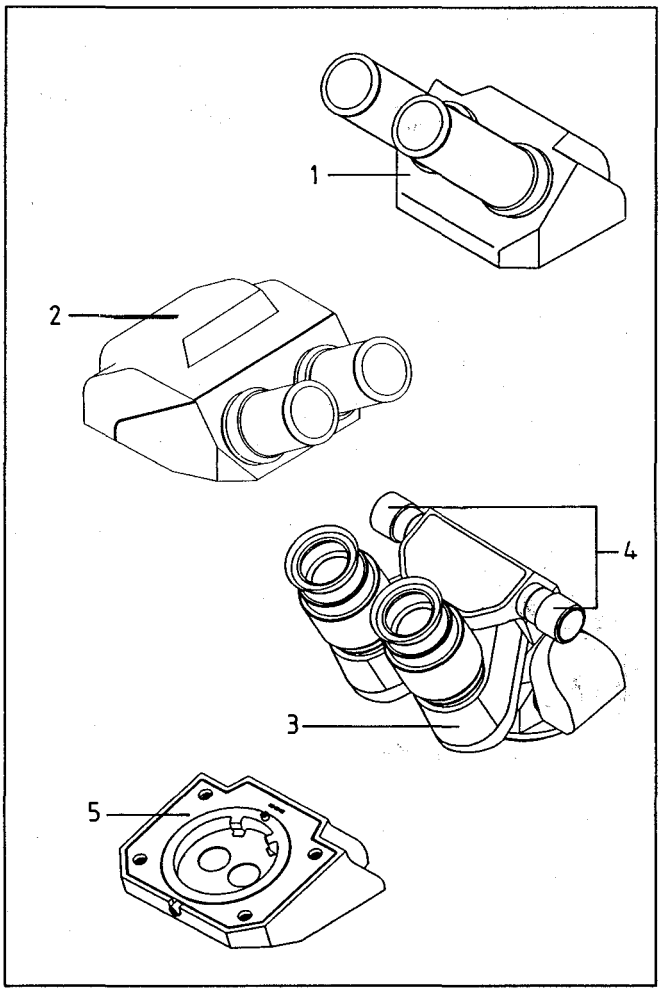

Total magnification and field of view

The total magnification of the stereomicroscope is calculated as follows:

$$M_{microscope} = F_{zoom} \times M_{eyepiece} \times M_{objective}$$

where:

F_{zoom}	zoom factor of the stereo body
$M_{eyepiece}$	magnification of the eyepiece
$M_{objective}$	magnification of the objective

The object field visible in the stereomicroscope is:

$$\text{Object field dia. [mm]} = \frac{FVN_{eyepiece}\ [mm]}{F_{zoom} \times M_{objective}}$$

FVN = field of view number of eyepiece

Objective magnification $M_{objective}$ = 100/f [mm] , if the focal length f of the objective is given.

General rules

- The illuminators described in the following can be used singly or in combination. Use as few light sources as possible. Shadows produced by several light sources cause unsteadiness in the image. It is possible to brighten hard shadows by the use of a second light source.
- Shadows may only be just visible and no more, otherwise they will appear too dark in the photograph. Shadows may, however, be used to advantage to judge the depth of the image.
- If more importance is attached to color than form in a color photograph, the illumination must be set to produce fewer shadows.
- With directed light, the brightness decreases as the square of the distance (the brightness difference between the object and the background can be easily set using different distances between the object and the background; with inclined illumination, the uniformity of object illumination increases, the greater the distance of the lamp.

Illuminators with 6V 10W halogen bulb

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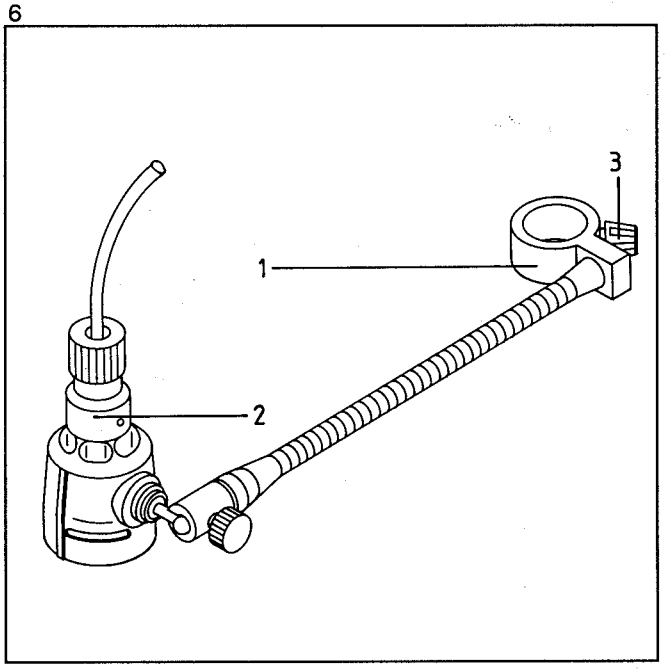

Illuminator 10 with support for 32 mm dia. column (Fig. 6)

Attach illuminator 10 (45 51 53) (2) and support (45 51 50) (1) to the stand column below the stereo body and secure with locking screw (3).
The lamp mount ,halogen bulb, transformer and power cable are the same as used in the illuminator 10 described in the following.

Illuminator 10 for integration in stemi carrier

Stand L already contains the lamp mount Hal (1), the illuminator 10 (3), a transformer with brightness control and a power cable with safety plug.
Also required are a 6V 10W halogen bulb (38 61 08) (2).

The following is required for the L0, N and special-purpose stands:

- Illuminator 10 (46 72 53-9902) (3)
- Mount Hal for illuminator 10 S with plug (46 80 43-9901) (1)
- 6V 10W step transformer (45 48 10) with power cable
  or stabilized power supply unit (45 84 15),
  and power cable with safty plug (38 01 37-6750)
- 6V 10W halogen bulb (38 61 08) (2)

Further accessories:

Filter holder for illuminator 10 (for 32 mm dia. filters)	46 60 51
Frequently used 32 mm dia. filters:	
KG 1 heat-absorbing filter	46 78 30
Interference filter, green	46 78 03
CB 12 conversion filter	46 78 50-9901

Installing the illuminator 10 into the microscope carrier:
The illuminator 10 is integrated in the microscope carrier at the factory. For subsequent installation, proceed as follows:

- Insert hood of illuminator 10 (3) from below or above into the microscope carrier (4) in such a way that the threaded hole (5) in the illuminator hood is aligned with the opening in the carrier.
- Hold top of the illuminator and screw in screw (6) including washer and plate spring in such a way that the illuminator can still be tilted with ease.
- Hold protective cap of halogen bulb (2) and push bulb into lamp mount (1); do not touch bulb with your fingers.
- Introduce lamp mount with inserted bulb into the illuminator hood in such a way that the pin of the illuminator hood engages with recess (5).
- Check transformer voltage given on the power plate. If this corresponds to the line voltage present, connect transformer to line supply. At rated voltage, the color temperature is approx. 2,900 °K. To achieve the best possible illumination of the object, turn (1) and tilt the illuminator as required.

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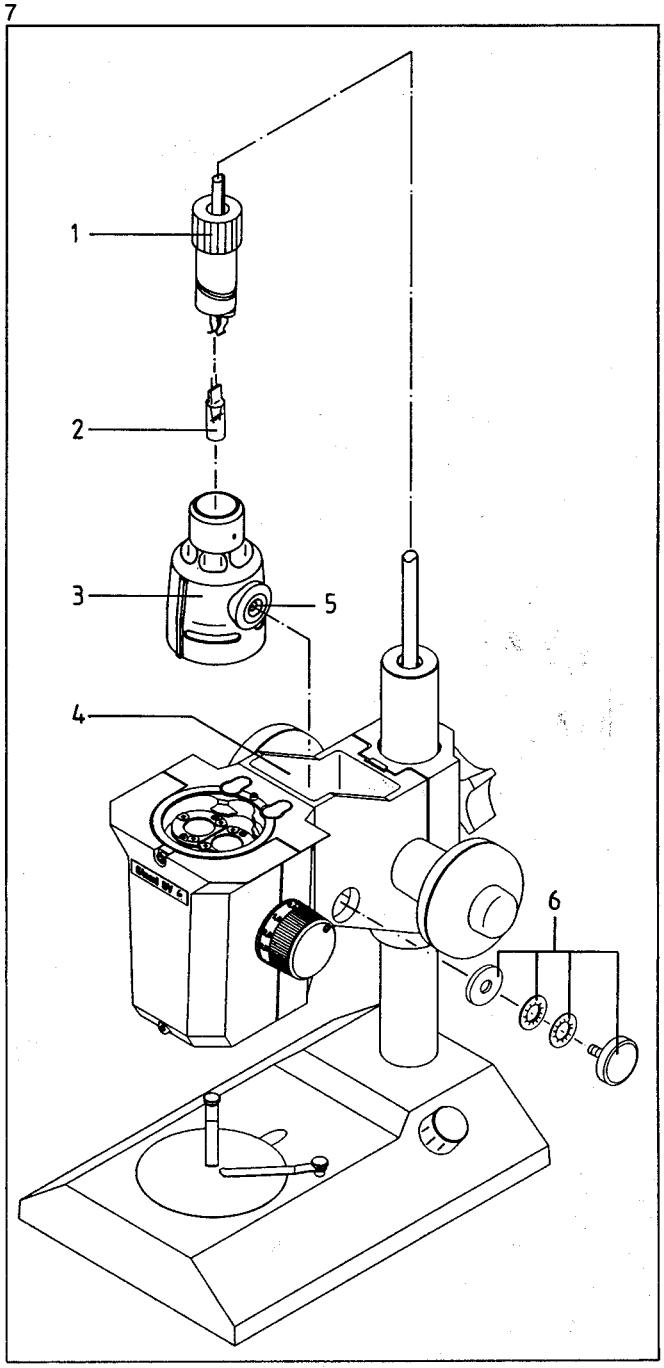

Illuminators with light guides

All illuminators with light guides must be connected to the KL 1500 electronic source (for 230 V: 41 70 75, for 115 V: 41 70 76).
For this, insert light guide in socket as far as it will go and tighten collet. The KL 1500 cold light source contains a 15V 150W halogen bulb.
(See also the instruction manual for the KL 1500 electronic.)

Illuminator with focusing lens attachment (45 51 45) (Fig. 8)
includes a flexible light guide (1) with rigid end and focusing attachment (2).

For mounting, proceed as follows:
- Insert end of light guide in mount (45 51 44) (3).
- Mount focusing attachment to end of light guide.
- Insert mount including light guide in the microscope carrier from above. Secure with locking screw (11) and washer.

The light guide can be bent and focused for optimum illumination of the object.
There is a special holder for light guides of Med stands (455185).

All-round reflected-light illumination system with dual light guide (45 51 46) (Fig. 9)
comprises the flexible light guide (4), holding ring (5) with a receptacle of 32 mm for the stand column and 2 self-supporting adjustable light guides (6). The two angeled light exit apertures can be turned through approx. 90° and fastened in position using screw (8).

To attach
- Attach the all-round illumination system to the stand column below the microscope carrier and secure with locking screw (12).
- Fasten focusing attachment (7) to light guide ends.
- Loosen screws (8) and adjust light guides to optain optimum illumination of the object, move focusing lens attachments back and forth.

Two-armed goose-neck light guide (41 70 75-9001) (Fig 10)
Goose-neck light guides are self-supporting fiber bundles with a diameter of 4.5 mm and a length of 750 mm. They can be separately adjusted to obtain optimum illumination of the object.
- Focusing lens attachment (9) (41 70 59-9901) can be mounted on the light guide for specimen illumination with focused light.
- Polarizing filter (10) (41 70 65) is screwed into the focusing lens attachment to eliminate surface reflections. For this, simple analyzer (45 51 70) must also be used on the objective S.

The following filters can be integrated in the KL 1500 electronic:

- Set of filters (yellow, blue, green and red)	41 70 75-9005
- Neutral density filter 0.25 (D)	41 70 75-9006
- Conversion filter (D)	41 70 75-9007

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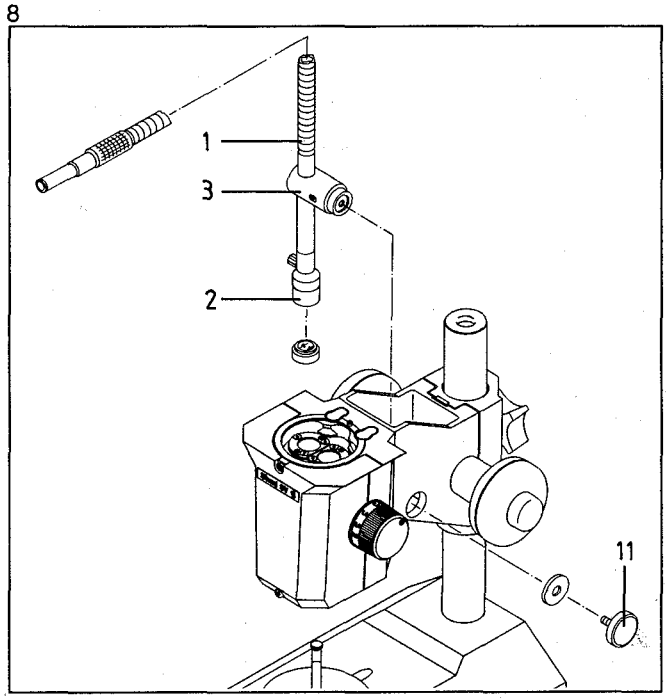

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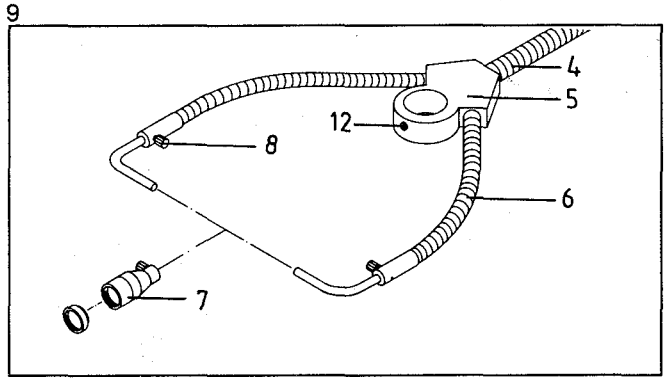

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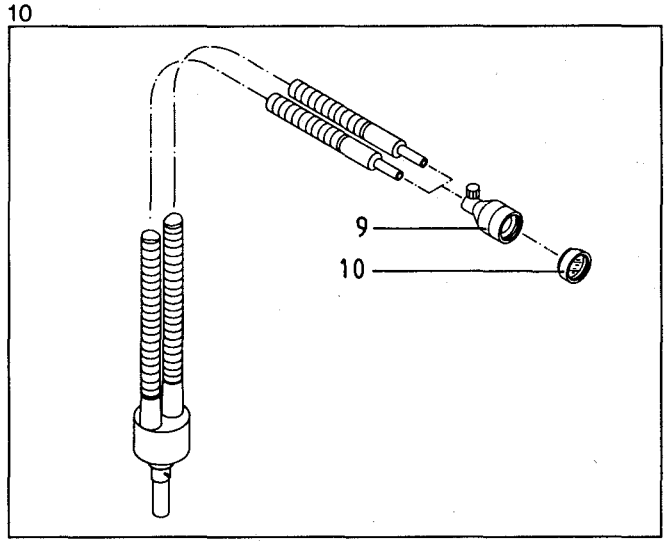


Coaxial reflected-light brightfield unit(45 51 58 9901) (Fig. 11)

for Planachromat S 1x objective to examine reflecting surfaces (sections, wafers etc.). This unit includes analyzers and polarizers in correct orientation to each other.
Also required :

Two-armed flexible light guide (4)	41 70 75 9004
and antiflex cap for objectives S (3)	45 51 65 9901

To attach:

- Remove objective (2).
- Attach coaxial brightfield unit (1) to the dovetail ring of the stereo body and tighten using an SW 3 screwdriver.
- Mount objective Plan S 1x (2) on brightfield unit.
- Fasten antiflex cap (3) to 53 mm dia. mount.
- Insert two-armed light guide (4) and fasten.
- While watching a reflecting surface, turn antiflex cap until maximum brightness is obtained.

Note: Edge-to-edge illumination of the field of view is ensured from zoom factor 1x upwards.

Slit-ring illuminator (41 70 68) (Fig. 12)

This illuminator produces a homogeneous, shadow-free illumination of the object center at a working distance of 30 mm to 70 mm.
Screw slit-ring illuminator with holder (45 51 84) (5) into objective thread M 49 x 0.75.
The illuminator may be attached directly to objective 1.6x (45 50 61) and secured with clamping screw (6).

Mirror module for vertical illumination (45 51 54)

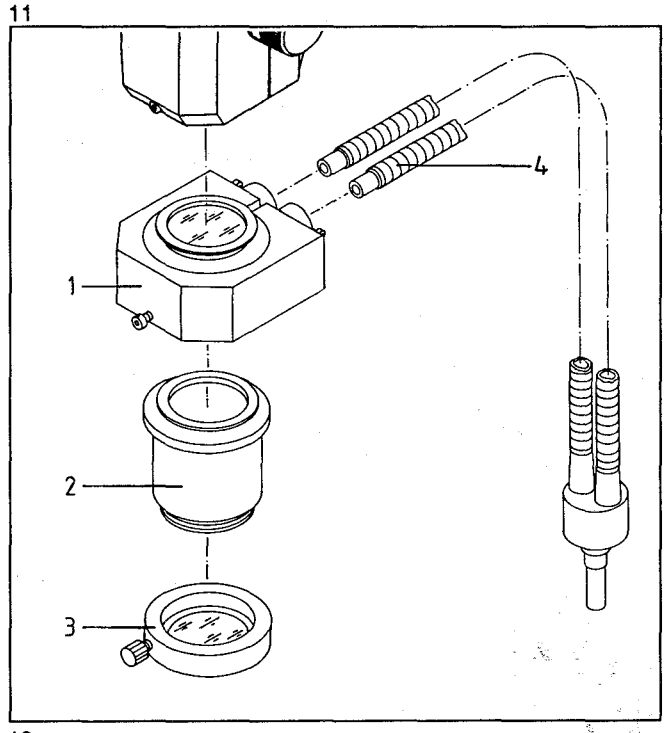
This module is especially suitable for the shadow-free illumination of narrow channels and contains a mirror and a mount. Also required is the flexible light guide (41 70 75-9002).

To attach:

- Attach module to an objective S with an external diameter of 53 mm and clamp in such a way that the knurled screw is above the objective locking screw.
- Insert light guide in socket and tighten locking screw.

The field of view may be vignetted with zoom factors below 1.2x.

11



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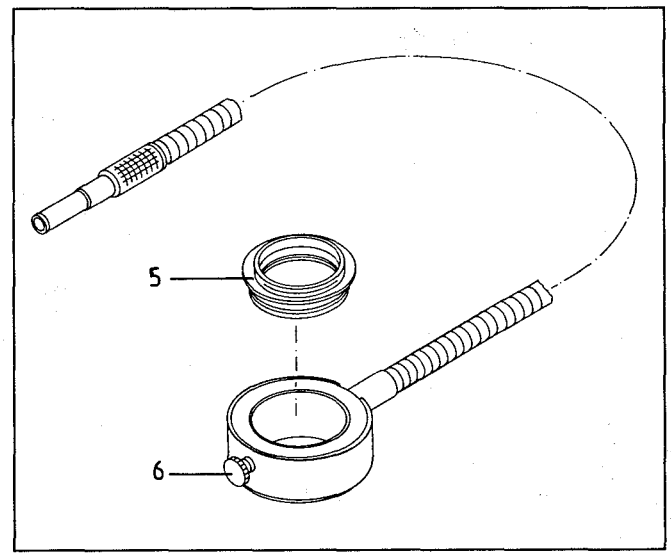


Transmitted-light attachment (45 51 36) (Fig. 13)
can be used in combination with the illuminator 10 (see page 11) or the illuminator with focusing lens attachment (45 51 45) (see page 12). For this, the halogen lamp or the light guide must be set to a vertical position to ensure that the light enters at (1). The transmitted-light attachment has two pins (2) for mounting on the stand base. The attachment is provided with a 84 mm dia. glass plate (3).
Stage clips (4) are available under ordering number 47 33 71-9902.

Transillumination unit for brightfield/darkfield (47 52 69) (Fig. 14)
is used together with the slit-ring illuminator (see page 13).

To attach:
- Insert base plate (8) instead of the 84 mm dia. stage plate in the stand base.
- Place slit-ring illuminator (7) on base plate.
- Place upper part of illuminator containing the HD slider on illuminator.
- Slider (6) has two positions:
  - an aperture with an opal glass plate for brightfield,
  - a vacant aperture for darkfield.
- If objectives ≥ 1.6x are used, insert plate with a 25 mm dia. aperture (in place of the plate with a 40 mm dia. aperture) in the 84 mm dia. opening (5) of the unit.

The transillumination unit for brightfield/darkfield is mainly used to enhance the contrast of colorless, low-contrast specimens.

All-round transmitted-light illuminator (45 51 40) (Fig. 15)
This unit has a work surface (200x160 mm) with integrated handrests. Brightfield, oblique brightfield and unilateral darkfield can be set using the integrated reflector system.
Also required:

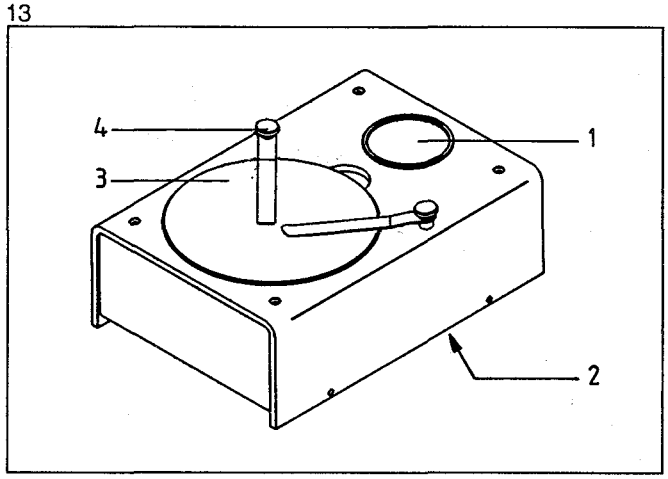
- 6V/20W halogen bulb	38 01 43-1350
- stabilized power supply unit with continuous power control	45 84 15
- power cable with safety plug	38 01 35-5810

Setup:
- Place all-round transmitted-light illuminator on a large stand plate (stand N or plate 32). Remove stage clips beforehand. The two pins on the underside of the illuminator must engage with the holes in the stand plate used.
- Check the voltage set. If this corresponds to the line voltage present, connect illuminator to power supply unit, then the unit to the line supply.
- Switch on power supply unit and set brightness as required.

Setting different types of illumination:

Lever (9) in pushed-in position:	brightfield illumination is set.
Lever to the right:	strong diffuse reflection
Lever to the left:	soft diffuse reflection

13



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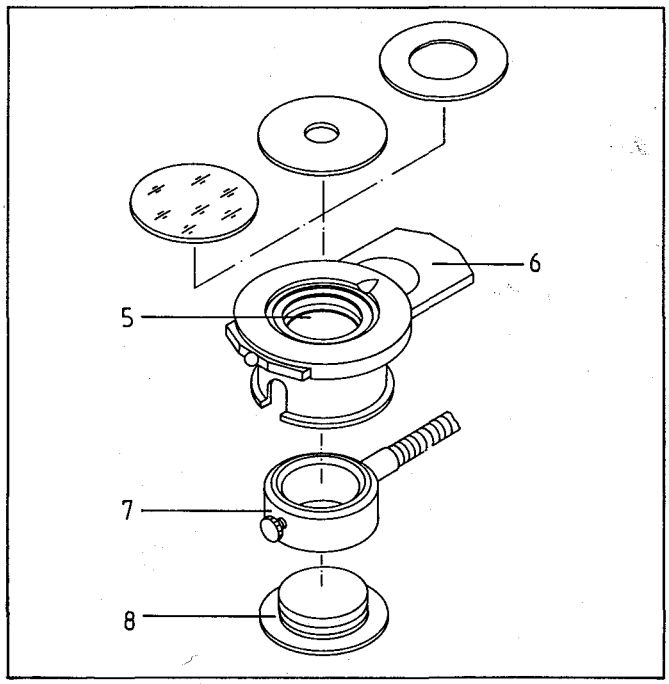

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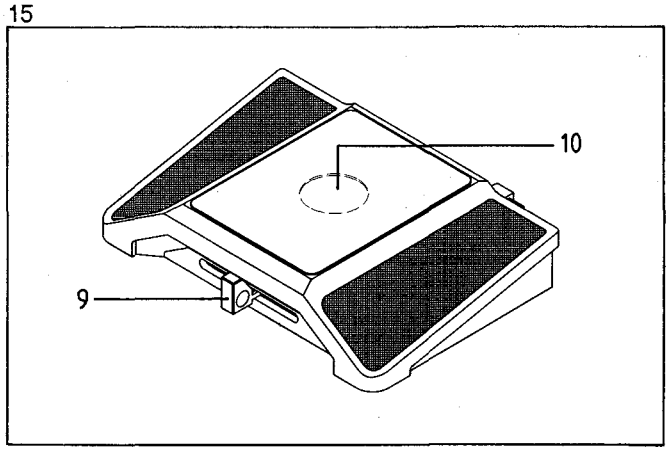


The lever can also be continuously pulled out. During this procedure, the illumination changes steplessly from oblique brightfield to unilateral darkfield.
If objectives ≥ 1.6x are used, remove the glass plate and insert plate with a 25 mm dia. aperture (in place of the plate with a 40 mm dia. aperture (10)) in the 84 mm dia. opening of the illuminator stage. Replace glass plate.

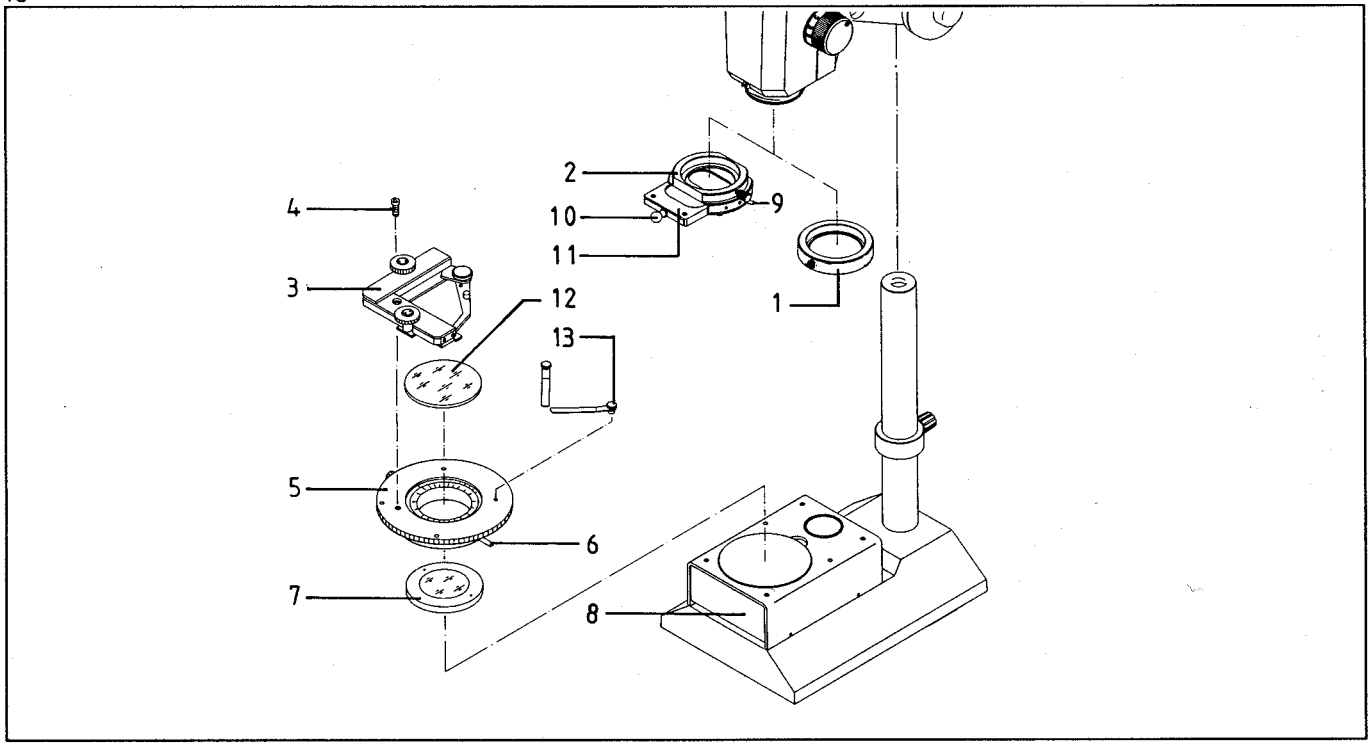
Changing the lamp:
- Remove transmitted-light illuminator from stand.
- Remove module containing the 6V/20W halogen bulb from the instrument rear. Remove halogen bulb.
- Use plastic bag to hold the bulb and insert it in the socket. Wipe off any fingerprints before the heat makes them impossible to remove. Replace module.
- The two pins on the underside of the illuminator must engage with the holes in the stand plate used.

Diffused-light box 2x8 W (41 52 57) (not shown)
for large, transparent specimens.
The work surface of this box is 200 mm x 160 mm.
It contains two 8W fluorescent lamps. Connect the light box to the 220 V, 50...60 Hz line voltage, using the integrated power cable. In general the box is mounted on stand N or the large stand plate 32.

For work in polarized light (Fig. 16)

we recommend using the rotatable stage (45 51 20) (5) transmitted-light attachment (45 51 36) and the high-intensity illuminator with focusing attachment (45 51 45).
- Insert polarizer (45 51 74) (7) from below in rotatable stage (5) in such a way that its dots coincide with those on the stage. Secure using the screws and the key supplied.
- Remove 84 mm dia. glass plate from transmitted-light attachment (8).
- Place the rotatable stage (5) in the opening of the attachment in such a way that the dots are oriented in the left-right direction.
- Fasten rotatable stage using clamping lever (6) and insert 72 mm dia. glass plate (12).
- Attach mechanical stage D (41 34 55) (3) to rotatable stage using screw (4) or insert 2 stage clips (13).
- Attach analyzer (45 51 70) (1) to a 53 mm dia. objective in such a way that its locking screw is directly positioned under the objective locking screw. Fasten.
- Attach analyzer (45 51 71) (2) to the objective in such a way that ball knob (10) is located under the objective locking screw, push in slider (11) as far as it will go and set lever (9) to "0". This orientates the analyzer in the north-south direction. In this setting, the field of view (without object) appears dark. To fine-adjust the dark setting, loosen lever (6) and slightly turn stage (5) including the polarizer. Switch on Red I by setting lever (9) to R I.

16



Stemi carrier with pinion box

The stemi carrier with pinion box is mounted on the stereo body on delivery. Star knob (3) is used to lock the microscope carrier on the stand column.

The following stemi carriers (Fig. 17) are available:

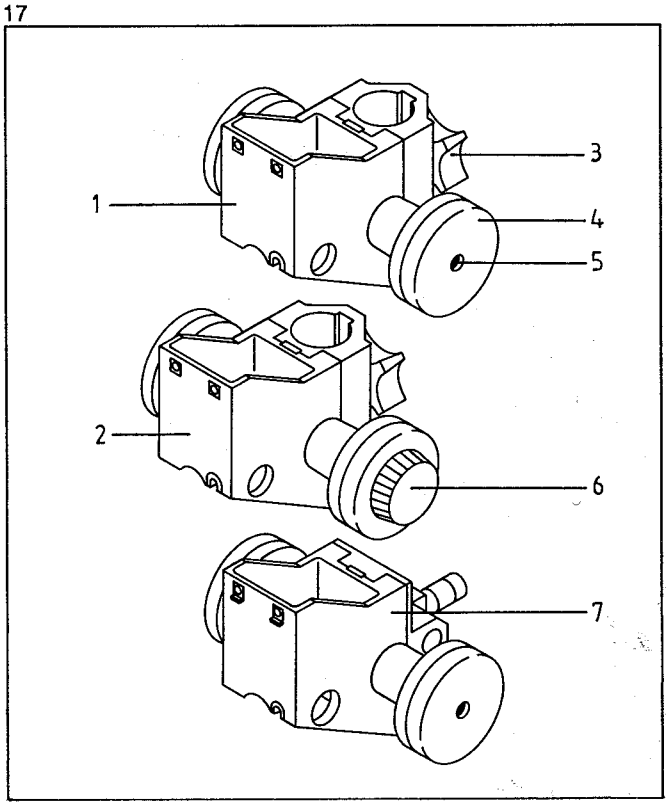
Stemi carrier for column 32 mm with pinion box (1) (45 50 90)
with knob (4) for fast focusing.
The setting range is 50 mm.

Stemi carrier with coarse and fine drive (2) (45 50 91)
The additional fine drive (6) on the right-hand side permits even more exact focusing of the image. This is of advantage in high magnifications, photomicrography and TV microscopy.
Transmission ratio: ≈ 1:5.

Stemi carrier for machine mount (7) (45 50 92)

An SW 3 screwdriver can be used to adjust the ease of motion of the focusing drive as required using screw (5) on all carriers. On the stemi carrier with coarse/fine drive, this setting is only possible on the left-hand knob.Turning the screw clockwise will result in stiffer motion, turning counterclockwise in easier motion. This may be necessary when additional equipment is used, such as a TV or 35 mm camera.

17

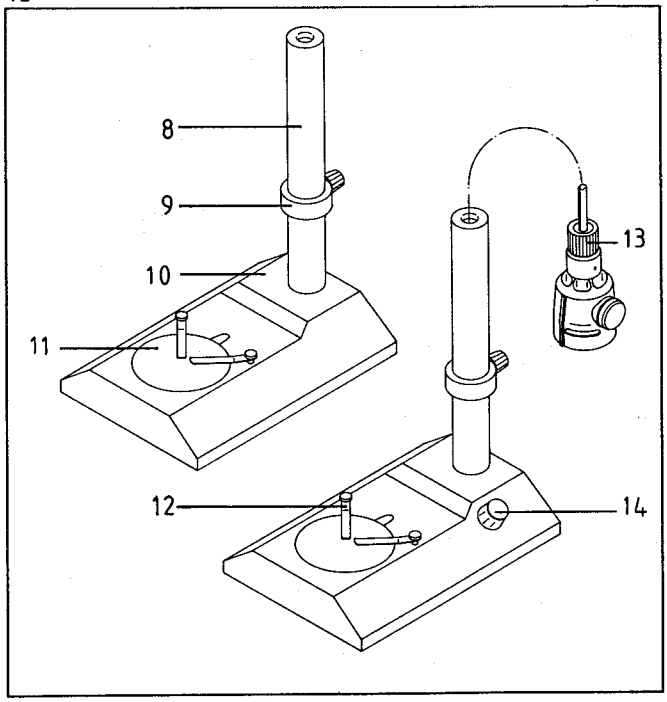


Stands

Stand LO (45 51 05) (Fig. 18)
has a permanently installed column with a diameter of 32 mm and a length of 260 mm (8). The securing ring (9) prevents inadvertent lowering of the stereomicroscope. The stand base (10) contains a removable 84 mm dia. stage plate (11) which is white on one side side and black on the other. The specimen is held by stage clips (12).

Stand L (45 51 10) (Fig. 18)
The design of stand L is the same as that of stand LO. Stand L also contains lamp mount Hal (13), the illuminator 10 and a transformer with brightness control for 220V, 50...60 Hz (455110) or 120V (45 51 08) with a power consumption of 18 VA. Power cable (38 01 37-6750) or (38 01 37-6740) with American flat plug. The instrument is interference-free, short-circuit-proof and complies with VDE, IEC, CSA and UL standards.
The stand L is categorized as a safety class I, type B instrument. Also required are a 6V 10W halogen bulb (38 61 08).

18



Stand N (45 51 07) (Fig. 19)
comprises a large base plate (450x350 mm) with an insert plate (3) and a column (1) with a diameter of 32 mm and a length of 350 mm with a securing ring (2).
This stand is ideal for large objects or for use with the all-round transmitted-light illuminator. The high stability of the stand allows the height of the configuration to be increased, e.g. stereomicroscope with microscope camera.
To remove black-white insert plate (3), press rear part of the plate.

The following two stand bases can be combined **with columns (32 mm dia.) of different lengths** :

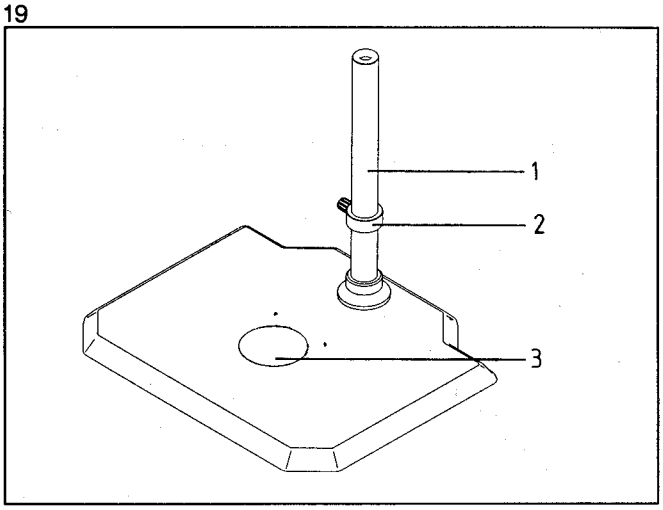
Large stand plate 32 (45 51 01) (Fig. 20)
Rugged, large base plate (500x400 mm) with receptacle (4) for columns of different lengths, see below. It is used with large objects and allows heavy microscope equipment to be mounted on the column.
Setting screw (5) on the rear right of the base plate is provided to compensate for any unevenness of the table top (SW 3 key).
The base plate comprises a securing ring, two stage clips and a black-white insert plate.
Retrofitting of insert plates: in the opening for 84 mm dia. plates, an insert plate can be aligned in such a way that it is flush with the large base plate using three setting screws (SW 2).
To remove the black-white insert plate, press front part of the plate.

Heavy stand base 32 (45 51 13) (Fig. 21)
The heavy base (20 kg) (6) with special feet ensures maximum stability even when bulky microscope configurations are used. The base allows equipment to be mounted on horizontal arm (8). To ensure stability, do not increase the extension of the horizontal arm unnecessarily. To change the vertical column, loosen screws (9) using an angled SW 3 Allen key.

Columns for stands with receptacles for 32 mm dia. columns:

Column, 350 mm long	47 51 23
Column, 450 mm long	47 51 20
Column, 650 mm long	47 51 19
Column, 210 mm long with end piece	47 51 22
Cross-piece, 32 mm dia. (7)	47 51 25
Horizontal arm with tilting mount 32/350 (8)	47 51 17
Adapter for Med stands	45 51 19

19



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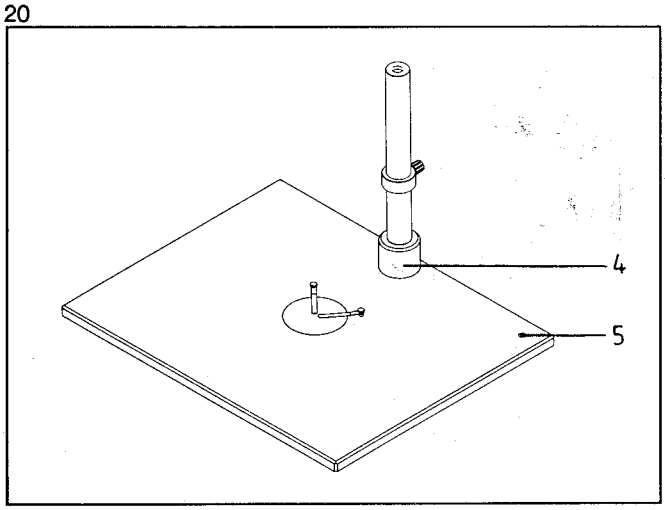

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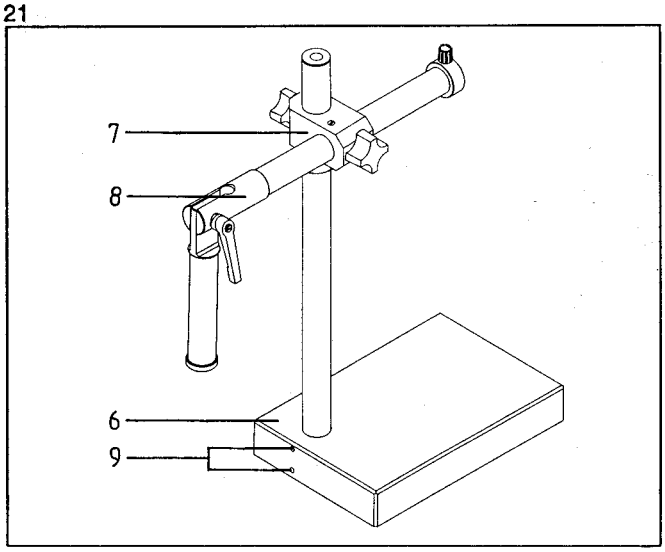


Specimen stages

The following stages are available for special applications:

Ball-and socket stage (41 52 25-9901) (Fig. 22)
Its round stage plate (dia. 135 mm) (1) with friction surface and stage clips can be tilted through 30° in any direction. A diffusing disk with a diameter of 32 mm is located in the center of the stage. The ball-and-socket stage can therefore also be used for transmitted-light applications. Additional 32 mm dia. filters can be placed on the diffusing disk.

To attach:
- Remove 84 mm dia. stage plate from stand base or glass plate from the transmitted-light attachment.
- Insert mounting ring (2) in 84 mm dia. opening.
- Insert ball-and-socket stage in ring (2).

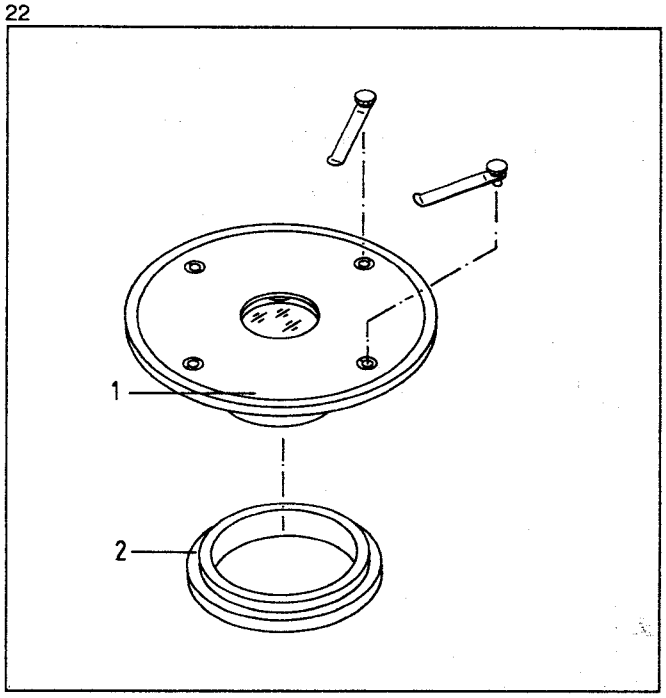
Rotatable stage (45 51 20)
as described on page 15 for polarization can also be used without a polarizer.

Upgradable stage (41 34 58) (Fig. 23)
comprising:
190 mm x 210 mm plate with 84 mm dia. opening (3),
2 stage clips and mount 32 with locking screw.

Attachable: mechanical stage (41 34 58-9001) (4) with horizontally mounted coaxial drive knobs for specimen movement in an area of 76 mm x 50 mm and
a mounting frame with glass plate (5) or mounting frames included in the Axiovert product range.
If the mechanical stage is not used, insert clear glass plate (47 52 65-0001) for transmitted light or black-white plate (47 52 91) for reflected light in the 84 mm dia. opening.
The hole circle is intended for mounting a coordinate measuring stage.

Assembly:
- Slide securing ring on the column and lower it to the base of the stand.
- Pass column through mount 32 (6) of the upgradable stage. Lock stage somewhere in the lower range of the column using the locking screw.
- Push securing ring upwards against stage carrier and lock.
- Mount mechanical stage (4) on the left-hand or right-hand side of the stage plate using two Allen screws (8). When the attachment for darkfield illumination (45 41 36) (see page 14) is used, the mechanical stage must be attached to the right-hand side, see Fig. 23. Remove 84 mm dia. insert plate beforehand.
- Push mounting frame (5) under clips (7) from the front until it engages.
- Mount stereomicroscope on the column as described.

22



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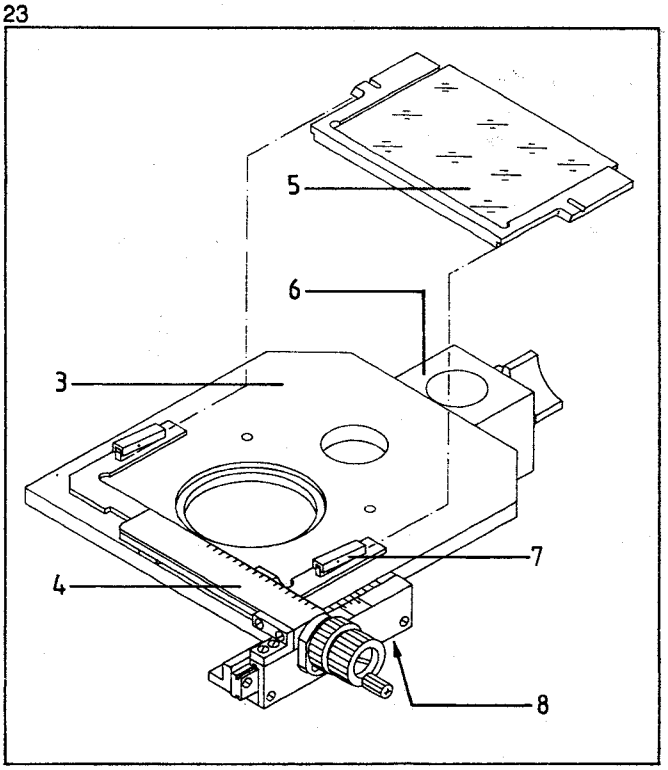


Phototubes and TV camera tubes

Microscope cameras, reflex cameras and TV cameras can be mounted on the stereomicroscope using a phototube or a TV camera tube.
To reduce the viewing angle, binocular tube S (45 50 76) or intermediate tube S 15° (45 50 85) can be mounted on the phototube or TV camera tube.

- Remove binocular tube.
- Place phototube or TV camera tube on stereo body and tighten locking screw.
- Place binocular tube on phototube or TV camera tube and tighten locking screw.

For operation of microscope cameras, we refer to:

MC 100 Microscope Camera	G 42-401
MC 80 Microscope Camera	G 42-407
SLR cameras for stereomicroscopes	G 42-406

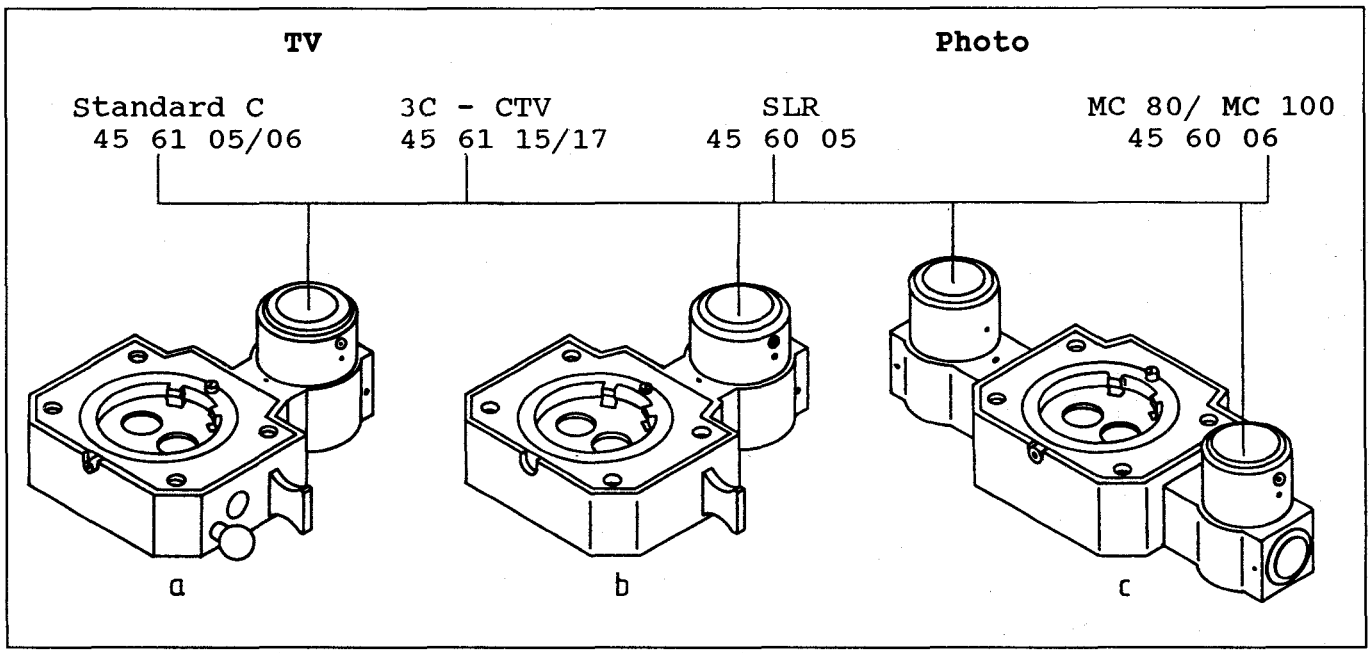
Phototube S 1.0x (45 50 80) (Fig. 24a)
This tube can be used to direct the light of the right-hand beam path to the camera. Pushrod (3)

when pushed in	all light to camera port
when pushed out	all light to binocular tube

The following cameras can be attached to the camera port (1):
- MC 100 microscope camera using adapter (45 60 06) with inserted photo eyepiece S-PI 10x or S-PL 12.5x
or MC 80 microscope camera using the same adapter with inserted projection lens P 2.5x (45 60 21).
- Reflex camera body with T-2 adapter for connection to adapter for SLR 2.5x (45 60 05) with T-2 thread, without eyepiece;
- TV cameras with standard C-mount using
- TV adapter 1.0x (45 61 05), without eyepiece
- TV adapter 0.5x (45 61 06), without eyepiece;
- TV cameras with 3C-CTV and ENG bayonet using
- 3 C-CTV adapter 1.0x (45 61 15), without eyepiece
- 3 C-CTV adapter 0.8x (45 61 17), without eyepiece.

A format outline reticle is used in the right-hand focusing eyepiece of the binocular tube. In conjunction with the S-PL 10x photo-eyepiece (44 40 39), format outline reticle (45 40 75) is required. If the S-PL 12.5x photo-eyepiece (44 40 49) is used, format outline reticle (45 40 76) is needed. The diameter of the format outline reticles is 26 mm, see table on page 8.
A film filter which you can cut yourself (23x20 mm), e.g. a Kodak Wratten filter (specialist trade), can be inserted in the slot of the filter slider (45 51 35) (2) for color filtering.

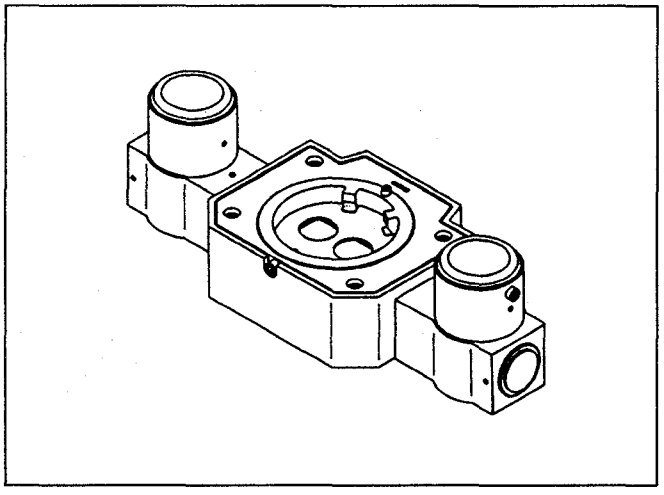
24



TV tube S (45 50 81) (Fig. 24b)
This intermediate tube has a fixed splitting ratio (50% light to camera and 50% light to observer).
The object can be viewed stereoscopically during TV display.
The camera port (factor 1x) of this tube is the same as that of phototube (45 50 80) already described.
A film filter (23x20 mm) (e.g. grey filter) which you can cut yourself can be inserted in the slot of the filter slider (45 51 35) (4) to adjust the light intensity to the sensitivity of the TV camera used.

TV and phototube S with two ports (45 50 82) (Fig. 24c and 25)
This tube allows the simultaneous use of 2 cameras, e.g. a microscope camera and a TV camera. The object can be stereoscopically viewed during work.
The beam splitting is fixed:
50% light for stereoscopic observation,
50% light to camera used from relevant beam path.

25



Drawing tube S (45 50 86) (Fig 26)
This tube is used to project a drawing surface lying on the right of the microscope into the microscope image and allows the drawing of microscope specimens. The image is not stereoscopic, which facilitates drawing.

Preparations and focusing:
- Stereomicroscope has already been focused on the object.
- Remove binocular tube S from stereo body.
- Mount drawing tube S on the right of the microscope, fasten and push in slider (1).
- Mount binocular tube S either directly on drawing tube S or on intermediate tube S 15° (45 50 85).
- Switch off microscope illumination.
- *Place drawing paper under the drawing tube. Use a pencil as* a focusing aid and look into the eyepieces. If necessary, use additional illumination.
- Adjust ring (2) in such a way that the pencil appears sharp in the plane of the paper.
- Switch on microscope illumination and adjust brightness in such a way that the microscope image and the drawing surface can be seen at the same time.
- A desk lamp is recommended for illumination of the drawing surface.

The drawing tube has a factor of 10x. The diameter of the drawing area covered is the product of the field of view number of the eyepiece and the factor of the drawing tube in mm.
Example: for eyepiece W-PL 10x/23, the diameter of the drawing area is 10 x 23 = 230 mm for a distance of 280mm (optical axis of drawing tube - drawing surface.
Knob (1) activates or deactives the projection facility.
Slider pulled out: stereoscopic observation.
After the two screws (3) have been loosened, the mirror module (4) can be rotated through 90°, e.g. for the projection TV monitors.

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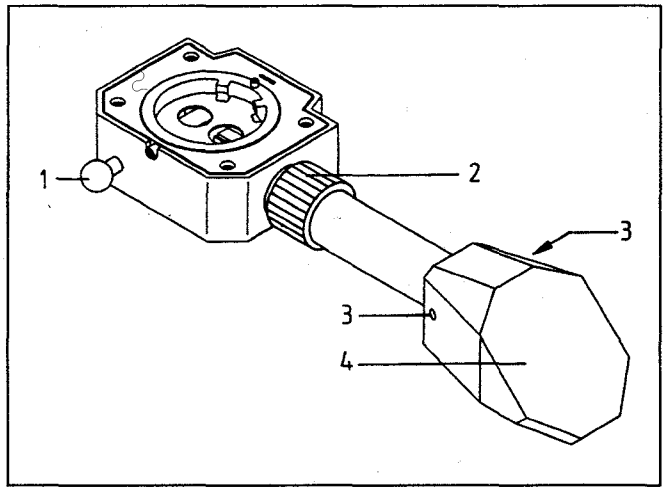


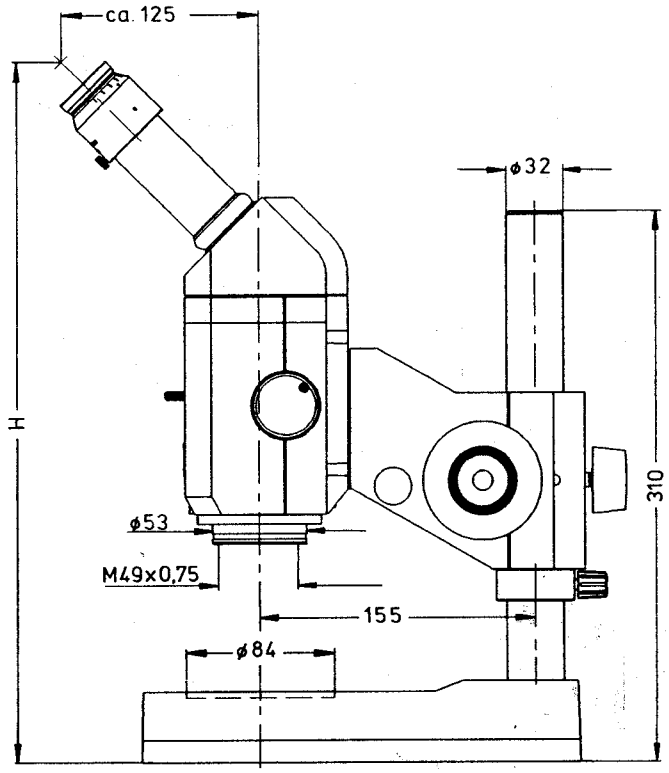
Protection against dust
If the instrument is not used for extended periods of time, cover it with a dust cover. Close tube openings with eyepieces or dummy plugs. When not in use, store eyepieces in cases to protect them against dust.

Cleaning
of objective front lenses, eyelenses, bulbs and filters:
Remove dust using a soft brush or a puffer brush. If fingerprints on glass surfaces cannot be avoided, breathe on them and remove them immediately using a clean optics cleaning cloth.
Fixed dirt, mascara etc.:
remove by moistening an optics cleaning cloth with a mixture consisting of distilled water and some liquid detergent.
To finish cleaning, breathe lightly on the glass surface and wipe with a clean cloth. Remove fluff or dust using a clean brush or puffer brush.
Check the surface cleaned using a loupe (eyepiece upside down).
The following method is also frequently applied for cleaning optical surfaces:
Moisten a stick with cotton wool wrapped around it with pure alcohol and remove dirt.

How to avoid fungus growth
In an extremely humid climate, it is advisable to store the optical components in an air-tight container with a desiccant (silica gel). If this is not available, the container should be heated to 40-50°C using a filament bulb and the air circulated with a ventilator.

Cleaning varnished surfaces on the stand
Fresh contamination (fingerprints etc.):
Dip cleaning cloth in a mixture of distilled water and some liquid detergent and remove dirt. Dry with a clean cloth.

Dirt of long standing:
Moisten cloth with gasoline, remove dirt and dry with a clean cloth. Make sure that the solvents do not seep into mechanical guideways as they remove the film of grease necessary for smooth operation. Do not grease or oil any controls or knobs.



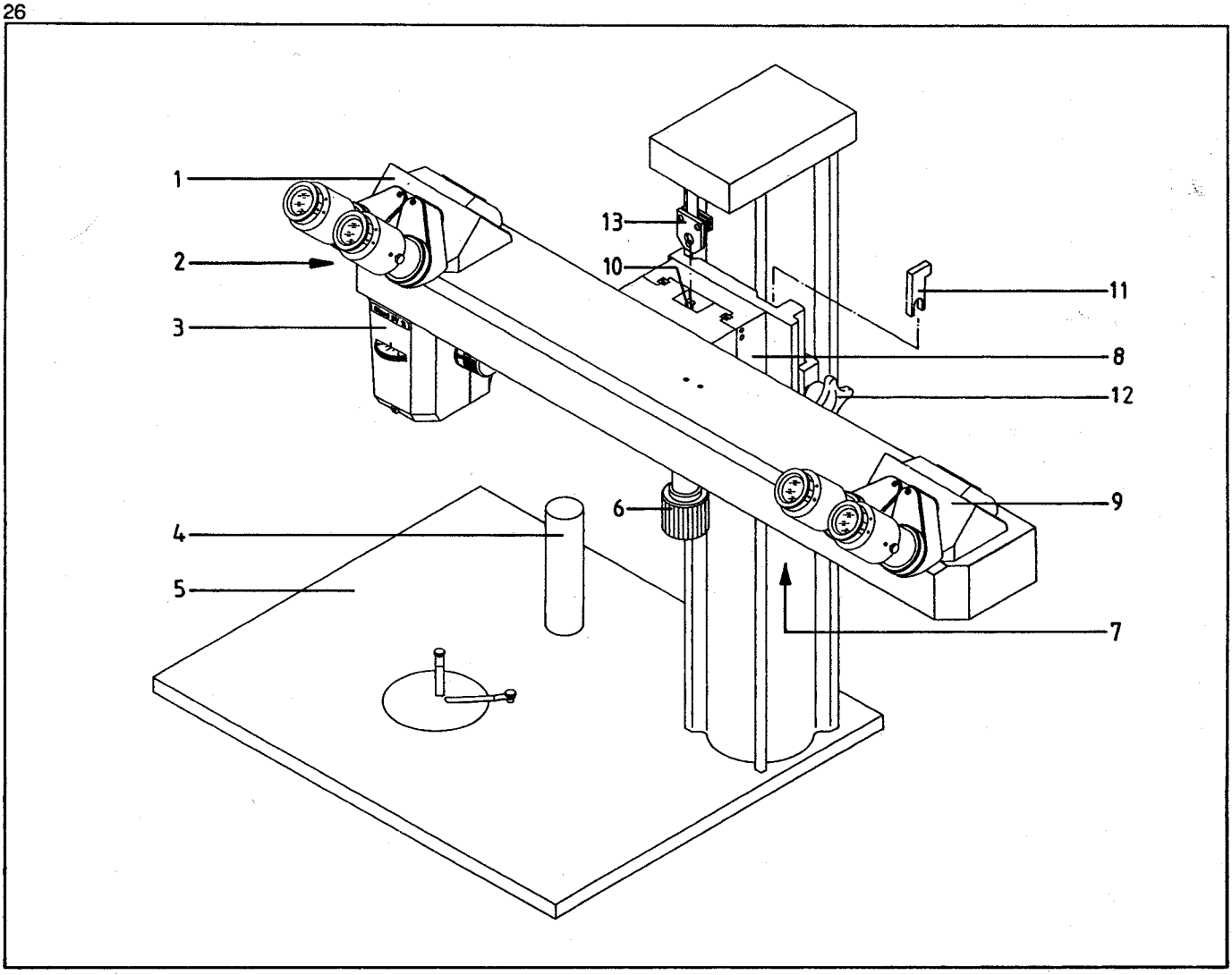
H = 410 mm, for SV 6 with Achromat S 1.0x on stand L
412 mm, for SV 11 with Planachromat S 1,0x on Stand N

The discussion stereomicroscopes allow the simultaneous observation of a specimen by two users. The coobserver sees the same, stereoscopic image as the main observer.
The discussion stereomicroscopes comprise a discussion stand (45 50 87), one stereo body and two binocular tubes with a low view viewing angle.
If requested, we will also supply the light pointer at (2) which enables the user to point to any specimen area in the field of view.
The brightness of the movable arrow is adjustable and can be adapted to the background of the object.

SV 11 Discussion Stereomicroscope

1 Binocular tube S with a low viewing hight
2 light pointer
3 SV 11 stereo body
4 32 mm dia. column, can be unscrewed
5 Base plate with a height-adjustable, 84 mm dia. insert plate
6 Fine focusing knob
7 Securing bracket
8 Microscope support with pinion box
9 Binocular tube for coobserver
10 Screw for suspending the counterweight
11 Clip for clamping jaw
12 Star knob for locking (8)

26



To assemble:

- Unpack stand and place on a stable worktable.
- Remove transport locking screw of the counterweight: for this, tilt stand and unscrew the red hex socket screw SW 5 on the underside.
- Lock securing bracket (7) in lower third of the column.
- Attach microscope carrier (8) to column and lock with star knob (12). Put red clip (11) supplied behind the clamping jaw. This will prevent the clamping jaw from sliding down too far when the height is readjusted.
- Connect the strap (13) to (10) on the pinion box.
- Attach both binocular tubes and insert focusing eyepieces.
- Mount objectives on stereo body.
- Mount illuminator, connect it to relevant power supply unit and switch on.

Retrofitting the light pointer at (2):

- Remove cover on the left-hand side of the microscope support.
- Place light pointer on the opening in such a way that the cable connection points to the rear. Fasten housing using the 2 screws of the cover.

The short column (4) is used for mounting illuminators, e.g. 45 51 52, or for mounting the upgradable stage with carrier plate 32 (41 34 58).

Adjusting the stereomicroscope

- Place specimen on stage.
- Set stereomicroscope to the approximate working distance:

- for this, use fine focusing knob (6) to set the movable part of the pinion box in such a way that it is flush with the fixed part.
- Loosen star knob (12).
- Set pinion box to height required on column and lock.
- Push securing bracket at (7) upwards as far as it will go and lock.

- Illuminate specimen uniformly.
- Focus specimen using the fine focusing knob (6).

To obtain a sharp image, the coobserver can use the dioptric adjustment device to set his refractive powers on the eyepieces.

Light pointer

- Check whether the voltage given on the plate of the plug-in power unit is the same as the line power available.
- Connect instrument to line.
- Adjust brightness to specimen using the knob on near wheel (2) of the light pointer.
- Set light pointer to a specimen area in the field of view by shifting or tilting wheel (2). For improved adjustment of the light pointer with the setting wheel, place finger tips on the light pointer mount. The adjustment range of the arrow is larger than the field of view, which is why the arrow can be moved out of the field of view.

Note: If only one tube is used for observation, 2 dummy plugs should be inserted in the other tube to prevent entrance of extraneous light.

NOTE : Before a long transport of the instrument, disconnect the strap, remove the red securing clip, remove the microscope support from the column and screw in the red securing screw for the counterweight.

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